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DIOPHANTINE ANALYSIS.

134. Proposed by O. E. GLENN, Ph. D., Springfield, Mo.

How many sets of solutions has the congruence $\lambda+\mu+\nu+\xi\equiv 0 \pmod{p-1}$ p being a prime number; the order of λ, μ, ν, ξ being disregarded.

GEOMETRY.

284. Proposed by JOHN JAMES QUINN, Ph. D., Warren, Pa.

a) Suppose that two radii R and r, whose center is the origin, revolve with uniform angular velocities 3θ and θ, respectively. What is the equation of the locus of P, the projection parallel to the X axis of the extremity of the radius r on the radius R produced if necessary.

b) Apply this curve to the trisection of an angle.

c) Suppose the ratio of their velocities is $n\theta:\theta$. Show how we can effect the multisection of an angle.

285. Proposed by G. E. BROCKWAY, Nashua, N. H.

Prove without the aid of the circle, that if the bisectors of the angles of a triangle be drawn, the greatest bisector falls on the least side.

286. Proposed by S. F. NORRIS, Baltimore City College, Baltimore, Md.

On the sides of a given triangle measure off equal distances from the extremities of the base, and at these points erect perpendiculars to the sides. Find the locus of the point of intersection of these perpendiculars. Solve by methods of analytic geometry.

287. Proposed by G. W. GREENWOOD, M. A., McKendree College, Lebanon, Ill.

Show that the points whose abscissae are 0, $a\sqrt{3}$, and $-a\sqrt{3}$ are points of inflexion on the locus $x^2y-a^2x+a^2y=0$.

MISCELLANEOUS.

157. Proposed by H. L. ORCHARD, M. A., B. Sc. (Unsolved problem in the Educational Times, London.)

An inelastic rod 9 feet long is placed with its upper end upon a rough vertical plane and its lower end on a smooth horizontal plane, and so that it makes an angle of 45° with each plane. It is now released, and strikes against a smooth sphere of 1 foot diameter placed in contact with the two planes. Determine the subsequent motion.

UNSOLVED PROBLEMS.

NOTE. The following problems still remain unsolved (in our columns).

Group Theory, 8. Proposed by L. E. DICKSON, Ph. D., The University of Chicago.

In a chess tournament between eight players, there are seven rounds, the eight players being paired in each round, every pair to be matched once and but once in the tournament. List the possible programs different except as to notation, *i. e.*, not transformable into each other by a substitution on eight letters. Give the number of conjugate programs of each representative retained.

Miscellaneous, 151. Proposed by W. J. GREENSTREET, M. A., Stroud, England.

Sum the series $\sum_{r=1}^{r=m} \operatorname{cosec}\left[\frac{2r-1}{4m}\pi+\theta\right]\operatorname{cosec}\left[\frac{2r-1}{4m}\pi-\theta\right]$.

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NOTES AND NEWS.

Mr. George Brett has been elected tutor in mathematics in the College of the City of New York.

The roll of foreign members of the Circolo Mathematico Di Palermo includes the names of forty-five Americans.

The list of active members just issued by the London Mathematical Society contains the names of thirty American mathematicians.

Father J. G. Hagen, S. J., professor of astronomy in Georgetown University, has been offered the directorship of the Vatican Observatory.

At its December meeting the Chicago Section of the American Mathematical Society elected officers for the year 1906, as follows: Chairman, Professor Alexander Ziwet; Secretary, Professor H. E. Slaught; additional member of the Executive Committee, Professor A. G. Hall.

Probably the oldest journal devoted to *elementary* mathematics is the *Maandelykse Mathematische Liefhebbery*, 1754—1769. The John Crerar Library in Chicago, has the complete set of seventeen volumes of this journal, which was published at Purmerende in the Netherlands.

Professor James Mills Pierce, Perkins professor of mathematics and astronomy at Harvard University, has presented his resignation to take effect a year hence. Professor Pierce's service at Harvard covers a period of fifty-two years, he having been appointed tutor in the University in 1854.

Dr. J. J. Quinn of Warren, Pa., is preparing a monograph on the trisection of the angle. It is to contain a large variety of solutions of the historic problem by higher plane curves and by analytic methods, with historical notes. He desires that all who have suggestions as to methods of dealing with the problem should send them to him. For these suggestions proper credit will be given.

The current number of the *Proceedings of the London Mathematical Society* contains the following contributions: "On the arithmetical nature of the coefficients in a group of linear substitutions of finite order" (second paper), by Pro-